Consumption Zones

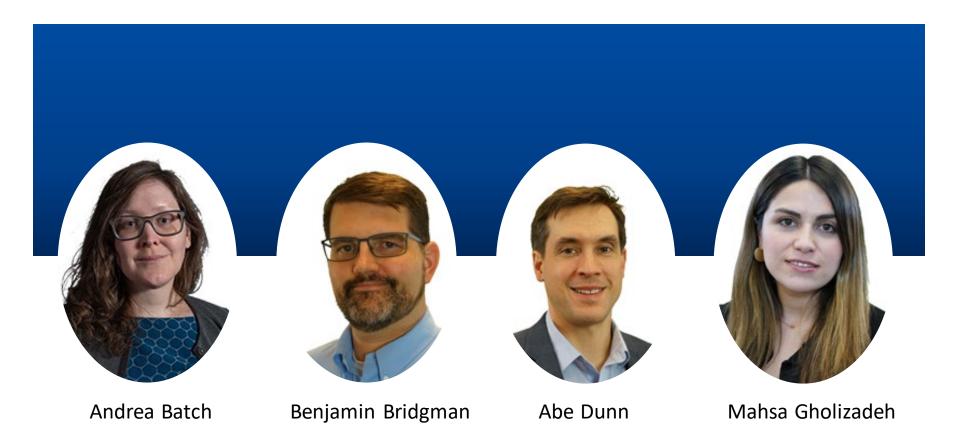
BEA Advisory Committee Meeting, May 10, 2024

Presenter: Mahsa Gholizadeh



Joint work between researchers in OCE and REA





Initial Comments for the Advisory Committee





Big data for new, improved or more detailed statistics



Consumption flows information



Applications for consumption zones

Motivation





Local area data important to many economic questions



Counties are finest available units for many data



Alternative geographical boundary definitions exist:

Core-Based Statistical Areas (CBSAs)
Commuting Zones (CZ)

- Use commuting patterns as source data
- Good for labor market questions



New Measure: Consumption zones



Consumption Zones

Geographic regions suitable for studying spending/consumption

County sales flow data based on card transaction data

Retail sales and services consumption may have different geographic markets

Preview of Results



Aggregate Consumption Zones (ConZs) smaller than Commuting Zones (CZ)

- 1,235 ConZs
- 810 CZs

Different industries have very different size zones

Food stores: 1,862 ConZs

Live entertainment: 322 ConZs

Frequent purchases much more local than infrequent

In application, market concentration lower with ConZ than political units:

- Gap biggest with infrequent purchases
- Most ConZ Herfindahl-Hirschman Index (HHI) are below antitrust scrutiny thresholds

Outline of Presentation





Clustering methodology



Consumption data



Consumption zone estimates



Application to concentration measures

Method for Constructing Consumption Zones





Similar to geographic clustering method used in calculations of commuting zones (CZs)

- Calculated through iterative process
- Use cross-county consumption flows
 - Start with initial clustering: Each county a cluster
 - Calculate how "close" each cluster is to all other counties: Most cross-county flows, scaled by total sales
 - Join two "closest" clusters into new cluster
 - Repeat until all clusters are above a predetermined distance ("height")
- Set height to 90% of consumption in-zone

Consumption Flows Data





Data source: Fiserv.

- Fiserv processes approximately \$2 trillion dollars of card transactions for US establishments.
- Information about credit, debit, and prepaid gift cards; all card networks (e.g. Visa, MasterCard, Discover).
- Data structure: Flows by industry.
 - County-by-county flows: The level of spending by residents from one county in all other counties.
 - o Three-digit North American Industry Classification System (NAICS) industries.
- Some data suppressed for confidentiality: few outlets/transactions.
 - Impute missing flows with unsuppressed flows, distance, population (Dunn & Gholizadeh 2023).
 - Most imputed: Live entertainment, building supplies, general merchandise.

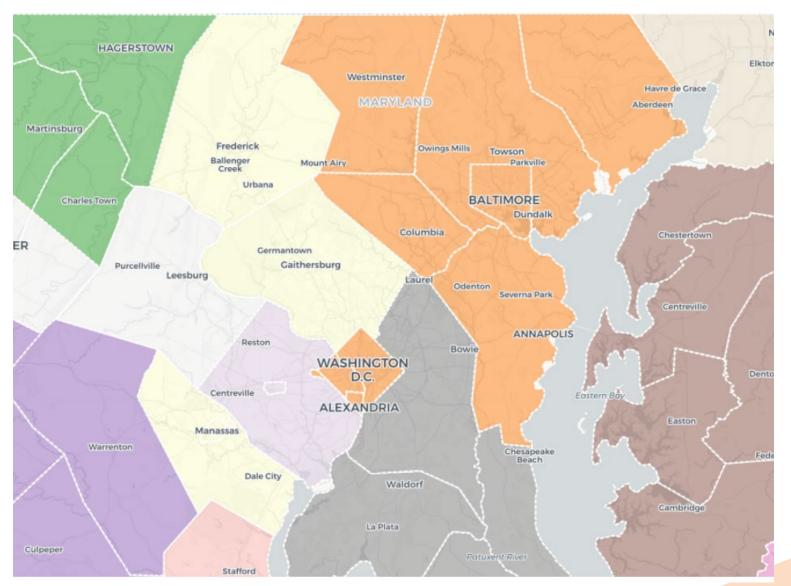
Consumption Zone Counts by Industry



Industry	Num. of Zones	Land Area (Sq. Miles) Mean	Population Mean	Share ConZ Crossed by CZ	Share CZ Crossed by ConZ
Commuting Zone	810	4,348	396,737	0	0
All Included Industries	1,235	2,851	260,208	0.265	0.584
Furniture and Home Furnishings Stores	570	6,178	563,784	0.553	0.51
Building Material and Garden Equipment	1,194	2,949	269,143	0.291	0.591
Food and Beverage Stores	1,862	1,891	172,587	0.118	0.764
Gasoline Stations	972	3,623	330,614	0.462	0.579
Clothing and Clothing Accessories Stores	567	6,211	566,767	0.672	0.531
Sporting Goods, Hobby, and Book Stores	554	6,357	580,067	0.634	0.546
General Merchandise Stores	1,198	2,940	268,245	0.324	0.627
Miscellaneous Store Retailers	900	3,913	357,063	0.511	0.556
Ambulatory Health Care Services	800	4,402	401,696	0.512	0.52
Performing Arts, Spectator Sports, etc.	322	10,937	998,003	0.568	0.658
Amusement, Gambling, and Rec. Ind.	530	6,644	606,334	0.545	0.504
Accommodation	383	9,195	839,052	0.493	0.568
Food Services and Drinking Places	997	3,532	322,324	0.42	0.57
Repair and Maintenance	1,009	3,490	318,491	0.386	0.557
Personal and Laundry Services	955	3,687	336,499	0.464	0.556

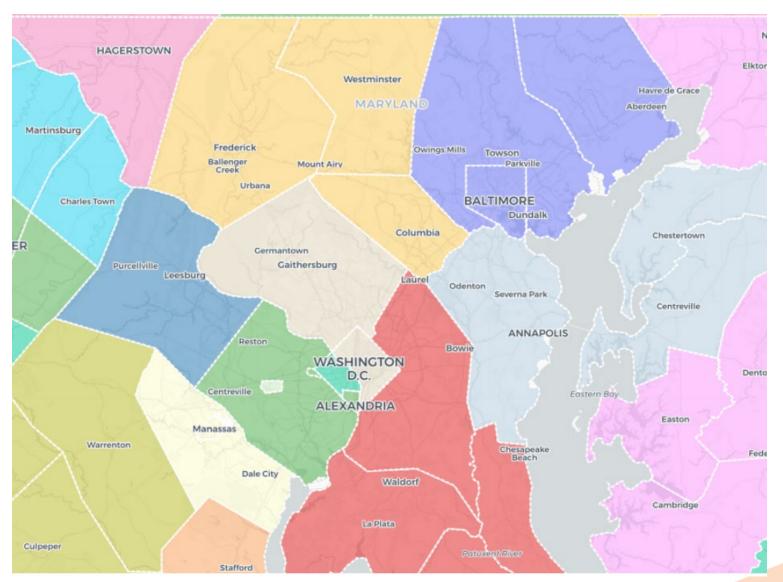
Consumption Zone Estimates: Commuting Zones (For Comparison)





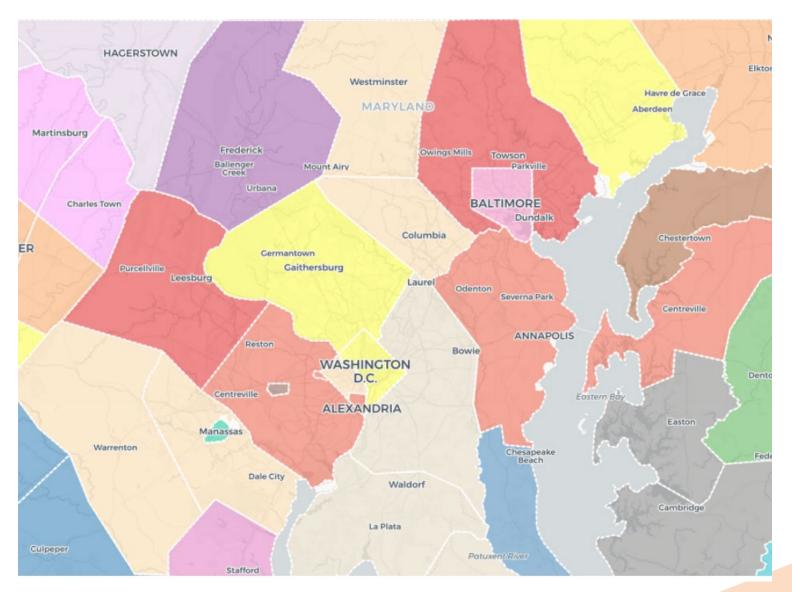
Consumption Zone Estimates: Aggregate Consumption





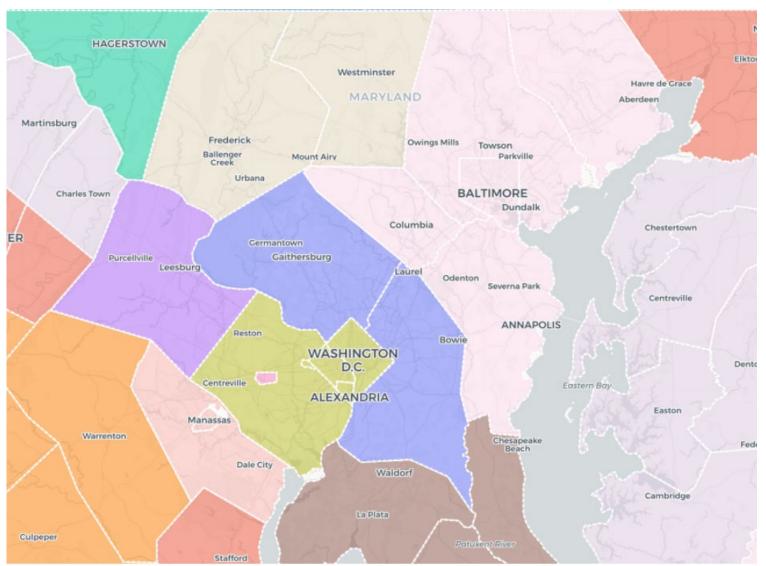
Consumption Zone Estimates: Food and Beverage Stores





Map: Consumption Zones (Food Services and Drinking Places)





Consumption Zone Estimates: Summary





Aggregate Consumption Zones (1,235) smaller than Commuting Zones (810)

The size of the industry-specific consumption zones depends on the properties of the industry

- Industries w. frequent purchases have smaller geo areas (Agarwal, et al. 2020)
- Non-durable goods/personal services local
- Durable goods/entertainment much broader

Different activities give different cluster sizes AND geographical boundaries

- Consumption Zones are not just sub-zones of Commuting Zones
- Distribution of outlets may be very different: many offices in CBD, few stores

Many Potential Applications





Policy and Business

- Measuring market power and concentration.
- Compiling consumer market research.
- Predicting the effects of taxes or subsidies in an area.



Research and Analysis

- Studying shocks to factors affecting consumption.
- Local economic shocks to income or wealth (many examples).



Economic Statistics

Local area price measurement

Application: Market Concentration





Market concentration significant area of inquiry



Retail/services consumed locally, need a measure of extent of market



Calculate Herfindahl-Hirschman Index (HHI)s for ConZs using National Establishment Time-Series (NETS) data

- HHI common, imperfect measure of market concentration
- Rossi-Hansberg et al. (2021) do similar exercise using political boundaries
- Smith & Ocampo (2022) do a similar exercise with CZs

Application: Are the Differences Economically Meaningful?





Need metric to compare concentration results in an economically meaningful way



We use the 2010 DoJ Horizontal Merger Guidelines thresholds for HHIs



Classify HHIs into three zones consistent with Guidelines (Nocke & Whinston 2020):

Red Zone Above 2500, concentrated, scrutiny likely

Green Zone Below 1500, un-concentrated, scrutiny unlikely

Yellow Zone Moderately concentrated



Input to actual regulatory activity, provides a policy relevant context



Guidelines not a rigid rule, much more goes into competition regulation

Application: Table: Sales-Weighted HHIs

Industry	County	ConZ	State	County	ConZ	State
	1990	1990	1990	2019	2019	2019
Furniture (NAICS 442)	759	380	124	1,003	521	226
Building Material (NAICS 444)	1,069	664	160	2,471	2,009	1,463
Food Stores (NAICS 445)	1,141	934	350	2,095	1,920	1,129
Gasoline Stations (NAICS 447)	2,323	1,830	912	3,783	3,344	2,059
Clothing (NAICS 448)	485	290	134	668	440	243
Sporting Goods, Books (NAICS 451)	667	350	151	1,072	643	360
General Merchandise Stores (NAICS 452)	2,011	1,467	695	3,372	3,081	2,637
Misc. Store Retailers (NAICS 453)	637	343	70	970	655	294
Ambulatory (NAICS 621)	494	304	66	629	431	138
Performing Arts, Sports (NAICS 711)	1,761	882	399	1,683	891	559
Amusement (NAICS 713)	1,619	1,067	525	1,563	1,059	493
Accommodations (NAICS 721)	1,405	833	315	1,333	864	412
Food Service (NAICS 722)	276	153	30	198	117	42
Repair and Maintenance (NAICS 811)	571	379	138	571	378	88
Personal and Laundry Serv. (NAICS 812)	528	328	84	582	400	127

5/3/2024

Application: Findings: Concentration





Consumption Zones (ConZs) market concentration lower than counties



Counties/ConZs agree at the extremes

 Two industries firmly in Red Zone: General Merchandise/Gas Stations



Disagreement on some infrequent purchase industries

- Infrequent goods draw from large area
- Many counties have few outlets since other counties serve that market
- Performing Arts/Recreation: Green with ConZ/Yellow with counties

Conclusions





This is part of a cross-directorate effort to research nonstandard or novel uses for alternative data including statistics on flows of spending across counties



Consumption zone statistics will be made available for data users on the BEA website (and a working paper link will be provided)



Looking forward, BEA plans to investigate other potential applications to spending flows data and for consumption zone information.

Questions to the advisory committee





How might these zones be used in application?



How might these data be used to strengthen or combine with other BEA statistics?



What type of disaggregate geographic detail is most useful? More timely data? Industry detail? Geographic detail?



• Thank you!